DOE's Nuclear Energy University Programs awarded INL advanced-degree intern Shadi Ghrayeb a doctoral fellowship worth $150,000 over the next three years for work toward a Ph.D. in nuclear engineering.

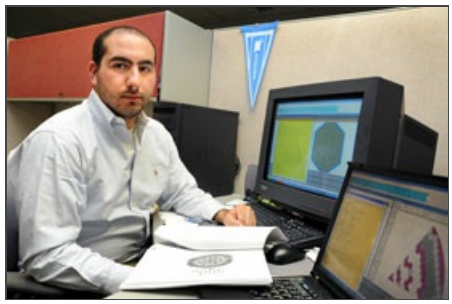
INL graduate student intern earns DOE nuclear energy fellowship

by Kortny Rolston, *INL Communications & Public Affairs*

Shadi Ghrayeb, an advanced-degree intern at Idaho National Laboratory, found his calling during his sophomore year of high school.

The Pennsylvania State University doctoral student was hunting for a science career that would be challenging and let him help people, but had nothing to do with medicine. His parents needed some convincing when he settled on nuclear engineering, but his decision has now paid off.

Ghrayeb recently learned he's one of 16 advanced-degree students chosen by the U.S. Department of Energy to receive $150,000 over the next three years to cover the cost of his doctoral education and research. But back in high school, his family envisioned him becoming a different sort of doctor.



This fall, Ghrayeb started work toward a nuclear engineering Ph.D. at Pennsylvania State University.

"When you like math and science, every parent's advice is to go into medicine, but I didn't want to do that. It seemed so boring," Ghrayeb said.

His research led him to nuclear energy. As he delved into it, he became convinced it was the right field for him. The issues facing nuclear energy, such as closing the fuel cycle, were interesting. And he figured working as a researcher in the energy field would definitely allow him to help people.

"In this field, you can help your neighbor, your community and your country," Ghrayeb said. "There aren't many careers where you find that."

Convincing his parents, however, was another matter.

They balked at the idea of their son being involved in the nuclear field. They envisioned him building top-secret weapons for the government.

"They have old-school thinking about nuclear," he said. "They thought I would be working on an island somewhere, three stories underground, and that I would never see daylight again."

Ghrayeb stuck by his decision. He graduated from Rensselaer Polytechnic Institute with a bachelor's degree in nuclear engineering and earned his master's in the same field.

This fall, he will begin pursuing a Ph.D. in nuclear engineering with the help of Nuclear Energy University Programs, a DOE Office of Nuclear Energy initiative administered by Center for Advanced Energy Studies staff in Idaho Falls.

Ghrayeb, who currently interns at INL, was one of 16 advanced degree students awarded an NEUP fellowship.

Dr. Marsha Lambregts, NEUP program manager, said Ghrayeb should be proud of his accomplishment.

"We received more than 100 applications for 16 fellowships so it was a very competitive process," she said. "Those who won had top-notch research proposals."

Ghrayeb's research will focus on how neutrons behave within the core of nuclear reactors, which could affect innovative reactor designs. Specifically, he'll be tweaking an equation engineers use to predict how neutrons act around heavy nuclides produced within fuel rods during the fission process. The altered equation will better predict the behavior of neutrons at certain energies deep in the core of reactor fuel assemblies.

Ghrayeb is excited to get started on his research. Even after studying nuclear energy for so many years, the field still captivates him.

"The idea that something so small can release so much energy just fascinates me," he said.

Feature Archive